

Docket 82023CPK
Customer No. 01333

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:
Didier J. Martin

A METHOD FOR REMOVING
POLLUTANTS FROM A
PHOTOGRAPHIC EFFLUENT

Serial No. 10/044,078

Filed 10 January 2002

Commissioner for Patents
P.O. Box 1450
Alexandria, VA. 22313-1450

Group Art Unit: 1723

Examiner: Kim, Sun U.

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Valerie J. Richardson
Valerie J. Richardson

December 24, 2003
Date

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	(Col. 1) CLAIMS REMAINING AFTER AMENDMENT		(Col. 2) + HIGHEST NO. PREVIOUSLY PAID FOR	(Col. 3) PRESENT EXTRA	OTHER THAN A SMALL ENTITY	
					RATE	ADDITIONAL FEE
TOTAL	0	MINUS	20	0	X 18	\$0
INDEP	0	MINUS	0	0	X 86	\$0
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM					+ 290	\$ 0
					TOTAL	\$0

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(For Extensions of Time and other Petitions to the Assistant Commissioner)

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

D. MARTIN

TITLE : A METHOD FOR
REMOVING POLLUTANTS FROM A
PHOTOGRAPHIC EFFLUENT

Serial No. 10/044,078

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Alexandria, VA 22313-1450

Group Art Unit: 1723

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Valerie J. Richardson
Valerie Richardson

December 24, 2003
Date

REQUEST FOR RECONSIDERATION

Sir:

In response to the Office Action mailed September 26,
2003, please reconsider the rejection in view of the following arguments.

Rejection Under 35 U.S.C. 103

Claims 1-10 have been rejected as unpatentable over
Nakamura (US 5,605,633) in view of Smith (US 5,766,478) and Martin
(US 5,998,108). This rejection is respectfully traversed.

Applicants claim a method for removing silver in complexed form
and thiosulfates from an aqueous photographic element, whereby the effluent can
be recycled and re-used for photographic processing, even when the initial
effluent was heavily polluted.

Nakamura describes a process for treating photographic effluents
resulting from a bleaching or fixing step. This process comprises the step of
adding to the effluent a polymer that forms a metal-polymer complex with the
metals contained in the effluent, and the step of separating of this metal-polymer

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complex from the effluents using a single layer membrane filter with pore size between 0.05 and 10 micrometers. The type of membrane used discriminates solely on the basis of the molecular size of the chemical species it retains. Molecules or particles that are smaller than the pore size pass through. This method uses a polymer of high average molecular weight, between 50,000 and 500,000, and cannot be implemented with complexing polymers of molecular weight lower than 50,000. In addition, the type of membrane used does not allow the separation of multivalent ionized salts such as thiosulfate. This leaves the treated water unfit for recycling in a photographic treatment bath, because the accumulation of thiosulfate in photographic baths adversely affects the sensitometric quality of the photographic products developed in them.

Smith describes the association of polyethyleneimine compounds with ultrafiltration to discard metallic species under cationic or anionic state. The complexing material (polyethyleneimine) cannot be used as a raw source from a commercial supplier and needs pre-purification (see col. 11, lines 62, col. 12, line 39). Example 16 (col. 50) shows the use of purified complexing agent to extract the silver from spent photographic effluent. There is no teaching about the recovery of thiosulfate and a possible recycling.

Martin describes a process for treating spent stabilizer bath through nanofiltration treatment. This invention allows the skilled artisan to reduce the volume of spent effluent and to reuse the permeate water to prepare fresh stabilizer bath without any consequence on the photographic sensitometry or the image stability (dark or light fading) of the EKTACOLOR Royal photographic paper. Martin describes the importance of the contact angle value of the membrane surface to treat various stabilizer baths in order to remove a maximum of contaminants (silver, thiosulfate, iron). The invention can be used to treat very concentrated spent effluent exhibiting high thiosulfate levels up to 14 g/l and silver levels in the range of 33 to 1.15 g/l (under thiosulfate complex) requiring a high operating pressure of at least 30 bars. To maintain the photographic sensitometry and image stability properties, the thiosulfate concentration would be inferior to 2 g/l, which implies that the recycling rate (corresponding to the ratio

between permeate volume and spent effluent volume) would be adjusted (66% for initial thiosulfate level equal to 14 g/l) in regard to the initial thiosulfate level to avoid exceeding the 2g/l thiosulfate threshold level.

Therefore, Nakamura and Smith describe the ability to remove silver compounds from spent effluents but without any impact on thiosulfate concentration and without any water recycling possibility. Martin describes the ability to remove silver and thiosulfate species but with some limitations in terms of recycling rate as a function of the spent effluent composition.

In the presently claimed invention, the method comprises a step of adjusting the pH, allowing the achievement of a better filtration capacity, with improved retention properties for thiosulfate and a higher recycling rate. Table 1 in Example 1, shows very well that using the claimed method, a low concentration of thiosulfate and complexed silver can be maintained, with the pre-treatment with polyethyleneimine. Moreover, Table 3 in Example 3, shows that the maximum yield of permeate (about 90%) is improved even when the pressure applied to the membrane of the nanofiltration unit was lowered to 10 bars. Example 4 shows that the permeate can be re-used in a processing bath. Moreover, in the present invention, polyethyleneimine is used without any purification, contrary to the teaching of Smith.

Neither Nakamura nor Smith teaches or describes that the polychthylenimine polymer can impact the thiosulfate concentration and the filtration step.

Neither Nakamura nor Smith nor Martin teaches or describes that the combination of both nanofiltration and polymeric material, with adjustment of pH, allows a reduction in the operating pressure conditions from 30 bars to 10 bars without any impact on the retention property of the considered species, silver and thiosulfate. Thus, the person of ordinary skill in the art has no reason to combine the documents of the prior art to reduce the thiosulfate concentration, to have a nanofiltration process that uses lower pressures, and to obtain a permeate

comprising the organic compounds that are necessary for re-using the permeate for photographic processing.

In view of the foregoing, it is believed that none of the references, taken alone or in combination, clearly fail to disclose or make obvious the claimed invention. Applicant believes that the unpatentability rejection under 35 U.S.C. 103 is, therefore, improper and respectfully requests withdrawal of the rejection. Early action to that end is earnestly solicited.

Respectfully submitted,



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